AMENDMENTS TO THE SPECIFICATION:

Please amend the paragraph beginning at page 3, line 22, as follows:

A plurality of electrodes of the sensor section are Al electrodes, and space between each of the Al electrodes may be insulated by γ-Al_2O_3. The side surface of the Al electrodes may be covered with a thin oxide film.

Please amend the paragraph beginning at page 4, line 27, as follows:

~~Fig. 4 is a view~~Figs. 4(a)-4(b) are views showing a constitution of an I/O unit of the on-wafer monitoring system.

Please amend the paragraph beginning at page 5, line 5, as follows:

~~Fig. 7 is a view~~Figs. 7(a)-7(b) are views showing a constitution of an on-wafer ion energy analyzer.

Please amend the paragraph beginning at page 5, line 9, as follows:

~~Fig. 9 is a view~~Figs. 9(a)-9(c) are views showing a manufacturing process of the ion energy analyzer.

Please amend the paragraph beginning at page 5, line 11, as follows:

~~Fig. 10 is a view~~Figs. 10(d)-10(f) are views showing a continued manufacturing process of the ion energy analyzer.

Please amend the paragraph beginning at page 5, line 13, as follows:

~~Fig. 11 is a view~~Figs. 11(a)-11(b) are views showing a constitution of a photon detector.

Please amend the paragraph beginning at page 5, line 16, as follows:

~~Fig. 14 is a view~~Figs. 14(a)-14(b) are views showing a constitution of the electron gun used in the ion radical analyzer.

HAYES SOLOWAY P.C.
3450 E. SUNRISE DRIVE,
SUITE 140
TUCSON, AZ 85718
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

Please amend the paragraph beginning at page 5, line 18, as follows:

~~Fig. 15 is a view~~Figs. 15 and 15(a)-15(b) are views showing a constitution of a micro spectroscope.

Please amend the paragraph beginning at page 5, line 19, as follows:

~~Fig. 16 is a view~~Figs. 16(a)-16(f) are views showing a manufacturing process of the ion radical analyzer.

Please amend the paragraph beginning at page 5, line 21, as follows:

~~Fig. 17 is a view~~ Figs. 17(g)-17(k) are views showing a continued manufacturing process of the ion radical analyzer.

Please amend the paragraph beginning at page 7, line 24, as follows:

~~Fig. 4 shows~~Figs. 4(a)-4(b) show a constitution example of the I/O unit. Fig. 4(a) shows a receiving section by photo diodes 212, 214. The photo diode 212 receives the instruction via optical signals from an outside photo diode (LD), and a difference is taken by the output from the photo diode 214 receiving background light and an operation amplifier 216. Then, a selective circuit 218 sends it to each sensor as [[a]] an instruction.

Please amend the paragraph beginning at page 9, line 8, as follows:

Firstly, as an example of sensors mounted on the on-wafer monitoring system 200, description will be made for the constitution of the ion energy analyzer by using [[Fig. 7]]Figs. 7(a)-7(b) and Fig. 8. Fig. 7(a) is a plan view seen from above, and Fig. 7(b) is a sectional view of Fig. 7(a) cut at A-A'. An area having a pattern size corresponding to the semiconductor device (SiO_2 421 in the drawing) and a collector electrode 413 in a layer under an analyzing device area of Fig. 7(b) make a structure where they are formed in a zigzag linear state as shown in Fig. 7(a). Fig. 8 shows the constitution of the entire measurement system using the electrodes and the like shown in [[Fig. 7]]Figs. 7(a)-7(b).

HAYES SOLOWAY P.C.
3450 E. SUNRISE DRIVE,
SUITE 140
TUCSON, AZ 85718
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

Please amend the paragraph beginning at page 9, line 24, as follows:

The ion energy analyzer is required to be capable of measuring voltage and current characteristics in a high-aspect pattern. Therefore, as shown in [[Fig. 7]]Figs. 7(a)-7(b), an electrode to which voltage is applied is embedded under the pattern of the SiO_2 layer 421 that is a plasma treatment object. Since voltage to be applied is as extremely high as up to 1kV on the assumption of silicon oxide film etching, an insulating film material requires high withstanding voltage. Thus, selection of material is quite important. In the present circumstances, Al_2O_3 that is anodized aluminum should be used.

Please amend the paragraph beginning at page 10, line 16, as follows:

By properly setting the voltage of each electrode, electron current/energy and ion current/energy, which are made incident to the etching pattern (SiO_2 layer 421 in [[Fig. 7]]Fig. 7(b)) can be measured, and in addition, charged particles such as electrons and ions are removed and neutral particles and photons can be taken out from the incident particles.

Please amend the paragraph beginning at page 12, line 8, as follows:

The structure of the ion energy analyzer is formed on the Si wafer by applying semiconductor device manufacturing technology. [[Fig. 9]]Figs. 9(a)-9(c) and [[Fig. 10]]Figs. 10(d)-10(f) are one example of the manufacturing process.

Please amend the paragraph beginning at page 14, line 16, as follows:

Fig. 11(a) shows the constitution of a photon detector 500. Although its constitution is basically the same as that of the ion energy analyzer 400 shown in Fig. [[7]]8, and the surface of an electrode 513 at the bottom is covered by an SiO_2 film 514 as shown in Fig. 11(a). As described, the silicon oxide film 514 may be the insulating film such as the silicon nitride film and the silicon oxynitride film, and it can identify the wavelength of light detected by the type

HAYES SOLOWAY P.C.
3450 E. SUNRISE DRIVE,
SUITE 140
TUCSON, AZ 85718
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

and the thickness of the insulating film. In the insulating film 514, the absorbance to the wavelength of light is known and the film is installed while the film thickness is controlled. The collector electrode 513 collects and measures the photoinduced current generated in the insulating film 514, and thus photons are measured. By monitoring the current flowing in the collector electrode 513, information regarding the wavelength of light that is made incident into the pattern can be obtained.

Please amend the paragraph beginning at page 15, line 6, as follows:

In the photon detector 500 of Figs. 11(a) and 11(b), the same voltage as in the ion energy analyzer shown in Fig. 8 is applied to each electrode to prevent electrons and ion from reaching the collector electrode and the like. In addition, the forming method is the same as [[Fig. 9]]Figs. 9(a)-9(c) and [[Fig. 10]]Figs. 10(d)-10(f).

<On-wafer radical ion species emission spectrophotometer>

Please amend the paragraph beginning at page 15, line 21, as follows:

The on-wafer radical ion species emission spectrophotometer 600 shown in Fig. 12 separates ions, electrons and radicals, which are made incident to a pattern 644, by using the same electrode structure (638 to 644) as the ones used in the above-described ion energy analyzer. Voltage for blocking electrons 622 and voltage blocking ions 624 are applied to the electrodes. Note that the electron structure used here is constituted by silicon and silicon nitride, but Al and Al_2O_3 may be used in the same manner as [[Fig. 7]]Fig. 7(b).

Please amend the paragraph beginning at page 16, line 15, as follows:

In the emission spectroscope detecting ion species and radical species, an electron beam source to allow ions and radicals to emit light is manufactured by using a micro field emission type electron gun. Its description will be made using Fig. 13 and [[Fig. 14]]Figs. 14(a)-14(b).

HAYES SOLOWAY P.C.
3450 E. SUNRISE DRIVE,
SUITE 140
TUCSON, AZ 85718
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

Please amend the paragraph beginning at page 17, line 12, as follows:

This is realized into the electron gun shown in [[Fig. 14]]Figs. 14(a)-14(b). Fig. 14(a) is a perspective view and Fig. 14(b) is a plan view seen from above. With the same construction as Fig. 13, an aluminum electrode 632, a silicon layer 633, and SiO_2 layer 634, a platinum electrode 635 and a platinum electrode 636 constitute the electron gun. A cover 616 for the electrode 615 and a cover for avoiding deposition 637 are formed by Si_3N_4, which prevents deposit from attaching to the electrode 615 and the platinum electrode 635.

Please amend the paragraph beginning at page 17, line 22, as follows:

~~Fig. 15 describes~~Figs. 15 and 15(a)-15(b) describe the construction of the micro spectroscope 650. As shown in Fig. 15, input light is reflected by a blazed grating 690 that is processed into a saw-tooth shape, for example, which is provided on the optical waveguide, the light is spectrally factorized into wavelengths λ_1 to λ_3, and photo-detecting device 674 to 678 detects them. As described, the micro spectroscope 650 is constituted by forming a diffraction device by a semiconductor device. The optical waveguide is formed in such a manner that an (n_1) layer having high refractive index in an (n_2) layer having low refractive index as shown in (a), or the (n_1) layer having high refractive index is sandwiched by the (n_2) layers having low refractive index as shown in (b). To form the layers having different refractive index, the layer having low refractive index is fabricated in the SiO_2 layer by iondoping or the waveguide may be formed by polyimide.

Please amend the paragraph beginning on page 18, line 13, as follows:

An example of the manufacturing process of the on-wafer radical ion species emission spectrophotometer 600 will be described using [[Fig. 16]]Figs. 16(a)-16(f) and [[Fig. 17]]Figs. 17(g)-17(k).

HAYES SOLOWAY P.C.
3450 E. SUNRISE DRIVE,
SUITE 140
TUCSON, AZ 85718
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

Please amend the paragraph beginning on page 19, line 10, as follows:

Fig. 18 shows another constitution of the electron gun. Although [[Fig. 14]]Figs. 14(a)-14(b) ~~illustrates~~ illustrate a constitution where electrons are emitted from three sides of a square and the waveguide 645 is installed on one side, its shape may be a circular shape as shown in Fig. 18. In Fig. 18, by applying voltage to an electrode for electron emission 712 and a mesh electrode 714, which are concentric circles, electrons emitted from the electron gun can be focused on a specified region (central area of the concentric circles) 716.

Please amend the paragraph beginning on page 20, line 3, as follows:

The on-wafer probe, as shown in Fig. 20, has basically the same structure as the ion energy analyzer shown in [[Fig. 7]]Fig. 7(b), where a collector as the bottom electrode performs voltage and current measurement. It is a micro probe capable of measuring electron current entered into etching patterns, electron energy distribution, ion current, electron temperature, electron density, charge storage amount, and the like by controlling voltage and the like applied to each electrode. It can be mounted as a sensor of the on-wafer monitoring system.

Please amend the paragraph beginning at page 20, line 12, as follows:

After exposing the sensor structure shown in [[Fig. 7]]Fig. 7(b) and Fig. 20 to plasma, constant voltage is applied between each electrode to measure the current flowing between the electrodes, by which aspect dependence of sidewall conductivity can be easily measured.

Please amend the paragraph beginning at page 22, line 4, as follows:

Explanation of Reference ~~Numeral~~Numerals

HAYES SOLOWAY P.C.
3450 E. SUNRISE DRIVE, SUITE 140
TUCSON, AZ 85718
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567